Linking California Mathematics Academic Content Standards and Service Learning

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As stated in the "Introduction" of the Mathematics Content Standards for California Public Schools, adopted by the California State Board of Education in December, 1977:

> *A high-quality mathematics program is essential for all students and provides every student with the opportunity to choose among the full range of future career paths. Mathematics, when taught well, is a subject of beauty and elegance, exciting in its logic and coherence. It trains the mind to be analytic-providing the foundation for intelligent and precise thinking.*
>
> *The mathematics content standards for kindergarten through grade seven are organized by grade level and are presented in five strands: number sense; algebra and functions; measurement and geometry; statistics, data analysis, and probability; and mathematical reasoning…The standards for grades eight through twelve are organized differently from those for kindergarten through grade seven. Strands are not used for organizational purposes because the mathematics studied in grades eight through twelve falls naturally under the discipline headings algebra, geometry, and so forth.*

One of the many goals in mathematics education is for students to:

> *Become mathematical problem solvers who can recognize and solve routine problems readily and can find ways to reach a solution or goal where no routine path is apparent.*

Using service learning as an instructional strategy provides many problem solving opportunities for students to develop math skills and abilities. Few strategies exist that provide such a meaningful context for mathematical education to occur. Many of the service learning activities described below can be easily adapted to enhance math skills at different grade levels and different levels of complexity. These real life situations that provide a meaningful context for students to develop fluency in basic computational skills, an understanding of mathematical concepts, mathematical reasoning and higher order thinking, and the ability to communicate precisely in mathematical terms. High quality service learning activities also foster civic responsibility, are easily linked to other academic disciplines, and assist students in meeting other academic content standards.

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
K	**<u>Food Collection Drive:</u>** Contact a local food bank/homeless facility to identify the need for a specific food item. Discuss the importance of healthy food with children and explain that many people do not get the food they need to be healthy. Conduct a collection drive for one specific type of food item (i.e. peanut butter) to be donated to the local food bank/homeless facility. Use the food items for a variety of mathematical learning opportunities: **Standard:** ***Number Sense*** **1.0** *Students understand the relationship between numbers and quantities (i.e., that a set of objects has the same number of objects in different situations regardless of its position or arrangement):* **1.1** *Compare two or more sets of objects (up to ten objects in each group) and identify which set is equal to, more than, or less than the other.* **Service Learning Activity:** Place jars of peanut butter in two or more sets and identify which set is equal to, more than, or less than the other. **Standard:** ***Number Sense*** **1.0** *Students understand the relationship between numbers and quantities (i.e., that a set of objects has the same number of objects in different situations regardless of its position or arrangement):* **1.2** *Count, recognize, represent, name, and order a number of objects (up to 30).* **Service Learning Activity:** Count, recognize, represent, name and order a number of jars (up to 30).	English/Language Arts, Science History/Social Science, Health Education,Visual and Performing Arts

K	**<u>Food Collection Drive cont.,</u>** **Standard:** ***Number Sense*** **1.0** *Students understand the relationship between numbers and quantities (i.e., that a set of objects has the same number of objects in different situations regardless of its position or arrangement):* **1.3** *Know that the larger numbers describe sets with more objects in them than the smaller numbers have.* **Service Learning Activity:** Know that the larger numbers describe sets if items with more objects than the smaller numbers have. **Standard:** ***Number Sense*** **2.0** *Students understand and describe simple additions and subtractions:* **2.1** *Use concrete objects to determine the answers to addition and subtraction problems (for two numbers that are each less than 10).* **Service Learning Activity:** Use peanut butter jars to determine answers to addition and subtraction problems (for two numbers that are less than 10). **Standard:** ***Number Sense*** **3.0** *Students use estimation strategies in computation and problem solving that involve numbers that use the ones and tens place.* **3.1** *Recognize when an estimate is reasonable.* **Service Learning Activity:** Estimate the number of jars in a particular area. Count the items and recognize when the estimate is reasonable.	

K	**<u>Food Collection Drive cont.,</u>** **Standard: *Algebra and Functions*** **1.0** *Students sort and classify objects:* **1.1** *Identify, sort, and classify objects by attribute and identify objects that do not belong to a particular group (e.g., all these balls are green, those are red).* **Service Learning Activity:** Identify, sort, and classify peanut butter by size, shape, or type (i.e. smooth or crunchy). **Standard: *Measurement and Geometry*** **1.0** *Students understand the concept of time and units to measure it; they understand that objects have properties, such as length, weight, and capacity, and that comparisons may be made by referring to to those properties:* **1.1** *Compare the length, weight, and capacity of objects by making direct comparisons with reference objects (e.g., note which object is shorter, longer, taller, lighter, heavier, or holds more* **Service Learning Activity:** Compare the length, weight, and capacity of peanut butter jars by making direct comparisons with reference objects. **Standard: *Measurement and Geometry*** **2.0** *Students identify common objects in their environment and describe the geometric features:* **2.1** *Identify and describe common geometric objects (e.g., circle, triangle, square, rectangle, cube, sphere, cone).* **Service Learning Activity:** Identify and describe common geometric objects of jars (i.e. cylinder).	

K	**<u>Food Collection Drive cont.,</u>** **Standard:** ***Measurement and Geometry*** **2.0** *Students identify common objects in their environment and describe the geometric features:* **2.2** *Compare familiar plane and solid objects by common attributes (e.g., position, shape, size, roundness, number of corners.* **Service Learning Activity:** Compare familiar plane and solid objects by common attributes of food items (i.e. position, shape, size, roundness, number of corners of jars). **Standard:** ***Statistics, Data Analysis, and Probability*** **1.0** *Students collect information about objects and events in their environment:* **1.1** *Pose information questions; collect data; and record the results using objects, pictures, and picture graphs.* **Service Learning Activity:** Ask students to sort peanut butter by type (i.e. smooth or crunchy) and collect data regarding quantity of food items for each category. Record the data using pictures or picture graphs. **Standard:** ***Statistics, Data Analysis, and Probability*** **1.0** *Students collect information about objects and events in their environment:* **1.2** *Identify, describe, and extend simple patterns (such as circles or triangles) by referring to their shapes, sizes, or colors.* **Service Learning Activity:** Ask students to sort food items by shape, size, or color and record data using pictures or picture graphs. **Standard:** ***Mathematical Reasoning*** **1.0** *Students make decisions about how to set up a problem:* **1.1** *Determine the approach, materials, and strategies to be used.* **Service Learning Activity:** Ask students to determine how many jars of smooth and crunchy peanut butter have been collected.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

K	**<u>Food Collection Drive cont.,</u>** **Standard: *Mathematical Reasoning*** **1.0** *Students make decisions about how to set up a problem:* **1.2** *Use tools and strategies, such as manipulatives or sketches, to model problems.* **Service Learning Activity:** Students determine the approach, materials, and strategies to be used, and use tools and strategies to model problems. **Standard: *Mathematical Reasoning*** **2.0** *Students solve problems in reasonable ways and justify their reasoning:* **2.1** *Explain the reasoning used with concrete objects and/or pictorial representations.* **Service Learning Activity:** Students explain the reasoning used with jars and/or pictorial representations. **Standard: *Mathematical Reasoning*** **2.0** *Students solve problems in reasonable ways and justify their reasoning:* **2.2** *Make precise calculations and check the validity of the results in the context of the problem.* **Service Learning Activity:** Students make precise calculations and check the validity of the results in the context of the problem.	

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
1	**Penny Drive:** Identify a specific social or environmental need. Contact a non-profit agency committed to meeting the identified need and ask agency staff to visit the classroom and share information with students about the problem that exists and how donated funds can help. Assist students with organizing a penny drive. Use pennies for a variety of mathematical learning opportunities: **Standard: *Number Sense*** **1.0** *Students understand and use numbers up to 100.* **Service Learning Activity:** Use pennies in a number of activities to help students understand and use numbers up to 100. **Standard: *Number Sense*** **2.0** *Students demonstrate the meaning of addition and subtraction and use these operations to solve problems.* **Service Learning Activity:** Using pennies as manipulatives, students demonstrate the meaning of addition and subtraction using operations to solve problems. Use operations to count the pennies collected each day. **Standard: *Number Sense*** **3.0** *Students use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, and hundreds places.* **Service Learning Activity:** Before counting pennies collected each day, ask students to make reasonable estimates by comparing larger or smaller numbers collected the day before. **Standard: *Algebra and Functions*** **1.0** *Students use number sentences with operational symbols and expressions to solve problems.* **Service Learning Activity:** Ask students to use number sentences with operational symbols and expressions to keep running totals of number of pennies collected each day.	English/Language Arts, Science History/Social Science, Health Education, Visual and Performing Arts

1	**<u>Penny Drive, cont.,</u>** **Standard:** ***Statistics, Data Analysis, and Probability*** **1.0** *Students organize, represent, and compare data by category on simple graphs and charts.* **Service Learning Activity:** Collect information about number of pennies collected each day. Organize data using pictures, bar graphs, tally charts, and picture graphs to determine amount of money collected each day. **Standard:** ***Mathematical Reasoning*** **1.0** *Students make decisions about how to set up a problem.* **Service Learning Activity:** Ask students to make decisions about how to set up the problem to determine which day netted the most amount of money, which day netted the least amount of money and the total amount collected. **Standard:** ***Mathematical Reasoning*** **2.0** *Students solve problems and justify their reasoning.* **Service Learning Activity:** Ask students to solve the problem stated above, justify the procedures selected and check the validity of the results from the context of the problem.	English/Language Arts, Science History/Social Science, Health Education, Visual and Performing Arts

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
2	**Create a Community Mural:** In your school or community, identify a need to honor individuals in the community "who make a difference". (This activity is also aligned to the Grade 2 History/Social Science Standard, "People Who Make a Difference".) Assist students in designing a mural to honor people in their community. Hold an election in the classroom or school to determine which individuals should be depicted on the mural. Ask students to nominate up to 25 individuals who have "made a difference" in their community. Ask voters to select no more than 20 individuals. Each of the 20 individuals selected will be painted by a different student on a 6" x 6" square and arranged in an array, 4 squares tall and 5 squares across. Design the mural using a variety of mathematical learning opportunities: **Standard: *Number Sense*** **2.0** *Students estimate, calculate, and solve problems involving addition and subtraction of two- and three-digit numbers:* **Service Learning Activity:** Estimate, calculate and solve the problem of determining which individuals should be depicted on the mural by counting the ballots and adding the totals from different classrooms or groups participating in the election. **Standard: *Number Sense*** **3.0** *Students model and solve simple problems involving multiplication and division.* **Service Learning Activity:** Use the 4 x 5 array of mural squares to model and solve problems involving multiplication and division. **Standard: *Number Sense*** **4.0** *Students understand that fractions and decimals may refer to part6s of a set and parts of a whole.* **Service Learning Activity:** Categorize the individuals to be depicted in the mural by gender. Apply fractional names to the groups to help students understand that fractions refer to parts of a set and parts of a whole mural.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

2	**<u>Create a Community Mural, cont.,</u>** **Standard: *Number Sense*** **6.0** *Students use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, hundreds, and thousands places.* **Service Learning Activity:** Ask students to use estimation strategies to estimate the amount of time it will take to complete the mural and the amount of paint, brushes, and other supplies that will be required. **Standard: *Algebra and Functions*** **1.0** *Students model, represent, and interpret number relationships to create and solve problems involving addition and subtraction.* **Service Learning Activity:** Ask students to model, represent, and interpret number relationships to determine the number of squares needed to be painted by each student in the classroom. **Standard: *Measurement and Geometry*** **1.0** *Students understand that measurement is accomplished by identifying a unit of measure, iterating (repeating) that unit, and comparing it to the item to be measured.* **Service Learning Activity:** Ask students to measure individual squares to the nearest inch, place squares alongside other squares and calculate the entire length and height of the mural. **Standard: *Measurement and Geometry*** **2.0** *Students identify and describe the attributes of common figures in the plane and of common objects in space.* **Service Learning Activity:** Identify and describe the attributes of each square according to the number and shape of its face, edges, and vertices. Adjoin two or more squares to form other shapes (rectangle). Divide a square in half, diagonally, to form two triangles.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

2	**<u>Create a Community Mural, cont.,</u>** **Standard:** ***Statistics, Data Analysis, and Probability*** **1.0** *Students collect numerical data and record, organize, display, and interpret the data on bar graphs and other representations.* **Service Learning Activity:** Collect numerical data and record, organize, display, and interpret the data on bar graphs and other representations regarding: • The election results of individuals to be depicted on mural • The make-up of individuals on mural classified by gender • The time it takes to design and complete the mural **Standard:** ***Statistics, Data Analysis, and Probability*** **2.0** *Students demonstrate an understanding of patterns and how patterns grow and describe them in general ways.* **Service Learning Activity:** Students demonstrate an understanding of the data presented above by recognizing simple number patterns.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
3	**<u>Community Garden:</u>** Create a school/community garden for the purpose of raising vegetables for a local food bank/homeless facility. Identify specific types of vegetables to be grown based on needs of local food bank/homeless facility, size of garden plot, weather, and soil conditions. Design the garden using a variety of mathematical learning opportunities. **Standard: *Number Sense*** **1.0** *Students understand the place value of whole numbers (up to 10,000).* **Service Learning Activity:** Calculate the number of seeds needed to plant the desired vegetables. Determine the number of seeds available in seed packets, the number of packets needed, and the cost of the packets. **Standard: *Number Sense*** **3.0** *Students understand the relationship between whole numbers, simple fractions, and decimals.* **Service Learning Activity:** Divide the garden into fractional subplots for growing different vegetables. Use the fractional parts to help students understand the relationship between whole numbers and fractions (i.e. 1/8 will yield lettuce, 1/8 will yield carrots, 1/4 of garden will yield tomatoes, and 1/2 will yield beans; 1/8 + 1/8 = 1/4; 1/8 + 1/8 + 1/4 + 1/2 = 1). **Standard: *Algebra and Functions*** **1.0** *Students select appropriate symbols, operations, and properties to represent, describe, simplify, and solve simple number relationships.* **Service Learning Activity:** Ask students to select appropriate symbols, operations, and properties to calculate spacing between plants, rows, number of plants per square foot, and potential yield.	English/Language Arts, Science History/Social Science, Health Education

3	**<u>Community Garden, cont.,</u>** **Standard:** ***Algebra and Functions*** **2.0** *Students represent simple functional relationships.* **Service Learning Activity:** Students use algebraic equations to calculate spacing between plants, rows, number of plants per square foot, and potential yield. **Standard:** ***Measurement and Geometry*** **1.0** *Students choose and use appropriate units and measurement tools to quantify the properties of objects.* **Service Learning Activity:** Determine the square footage of the garden plot and the amount of fertilizer and/or top soil needed to cover area. Determine the perimeter of individual subplots and the entire plot to determine the amount of string/fencing material to protect plants. **Standard:** ***Measurement and Geometry*** **2.0** *Students describe and compare the attributes of plane and solid geometric figures and use their understanding to show relationships and solve problems.* **Service Learning Activity:** Identify attributes of various sizes, shapes of subplots. **Standard:** ***Statistics, Data Analysis, and Probability*** **1.0** *Students conduct simple probability experiments by determining the number of possible outcomes and make simple predictions.* **Service Learning Activity:** Determine the probability of yield based on calculations above. Throughout the planting process, collect data regarding growth per week and vegetables harvested. Make growth predictions every week based on data collected. Compare findings with predictions made using a bar graph or line plot.	English/Language Arts, Science History/Social Science, Health Education

3	**<u>Community Garden, cont.,</u>** **Standard: *Mathematical Reasoning*** **1.0** *Students make decisions about how to approach problems.* **Service Learning Activity:** Ask students to make decisions to determine which vegetable produced the best results in terms of time, energy, and space allotted for maximum yield. **Standard: *Mathematical Reasoning*** **2.0** *Students use strategies, skills, and concepts in finding solutions.* **Service Learning Activity:** Students use strategies, skills, and concepts to find solutions and provide justifications to determine which vegetable produced the best results in terms of time, energy, and space allotted for maximum yield. **Standard: *Mathematical Reasoning*** **3.0** *Students move beyond a particular problem by generalizing to other solutions.* **Service Learning Activity:** Ask students, "If you had a garden plot twice as big as the one we had, what would you grow? Would you do anything differently?" Students use their knowledge and skills to make generalizations to other situations.	English/Language Arts, Science History/Social Science, Health Education

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
4	**<u>Senior "Buddy" Program:</u>** Provide companionship for senior citizens in the community by forming a partnership with a local retirement home/senior community center. Pair up students with senior members to participate in a number of activities that provide opportunities for mathematical learning. **Standard: *Number Sense*** **1.0** *Students understand the place value of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.* **Service Learning Activity:** Ask students to conduct oral interviews of seniors. Record the life experiences of seniors in a time line format. Use specific dates and ages (in decimal form) to denote significant events. Designate periods of time in a decimal and fractional format (i.e. 1/4 or 0.25 portion of a Senior Buddy's life was spent as a student). **Standard: *Number Sense*** **2.0** *Students extend their use and understanding of whole numbers to the addition and subtraction of simple decimals.* **Service Learning Activity:** Use the timeline to answer questions requiring addition and subtraction of simple decimals (i.e. How much time elapsed between your Senior Buddy's wedding day and birth of his/her first child?) **Standard: *Number Sense*** **3.0** *Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations.* **Service Learning Activity:** Use information from timelines of all Senior Buddies to compile data using standard algorithms involving multidigit numbers (i.e. What are the combined ages of all Senior Buddies? What is the difference in ages between the oldest Senior Buddy and the youngest Senior Buddy?)	English/Language Arts, Science History/Social Science, Health Education,Visual and Performing Arts

4	**<u>Senior "Buddy" Program, cont.,</u>** **Standard: *Algebra and Functions*** **1.0** *Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences.* **Service Learning Activity:** Use information from oral interviews to formulate answers to algebraic equations (i.e. $x = y + z$; *x = number of years living, y = number of years living in California, z = number of years living in other states).* **Standard: *Measurement and Geometry*** **1.0** *Students understand perimeter and area.* **Service Learning Activity:** Create a quilt that depicts different events of the life of each Senior Buddy. Use rectangular shapes within the quilt to help students understand perimeter and area. **Standard: *Measurement and Geometry*** **3.0** *Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.* **Service Learning Activity:** Use triangular shapes within the quilt to understand definitions of angles, degrees, fractions, and attributes of different types of triangles (equilateral, isosceles, scalene). Use different quadrilateral shapes within the quilt to learn of their attributes (i.e. rhombus, square, Rectangle, parallelogram, trapezoid).	English/Language Arts, Science History/Social Science, Health Education, Visual and Performing Arts

4	**<u>Senior "Buddy" Program, cont.,</u>** **Standard: *Statistics, Data Analysis, and Probability*** **1.0** *Students organize, represent, and interpret numerical and categorical data and clearly communicate their feelings.* **Service Learning Activity:** Collect, organize, represent, and interpret numerical and categorical data from oral interviews around a variety of topics (i.e. number of Senior Buddies who are veterans, grandparents, immigrants, community volunteers, voters in last presidential election). **Standard: *Statistics, Data Analysis, and Probability*** **2.0** *Students make predictions for simple probability situations.* **Service Learning Activity:** Express outcomes, verbally and numerically of experimental probability situations reflected above. Make predictions for probability situations of future generations. **Standard: *Mathematical Reasoning*** **1.0** *Students make decisions about how to approach problems.* **Service Learning Activity:** Using strategies, skills, and concepts learned from Senior Buddy project, ask students to make decisions about how to conduct surveys of other populations. **Standard: *Mathematical Reasoning*** **2.0** *Students use strategies, skills, and concepts in finding solutions.* **Service Learning Activity:** Students contact local agencies/organizations and government offices to identify a need to conduct a survey of specific groups for a specific purpose (i.e. needs of single parents, "at-risk" teens). Use strategies, skills, and concepts learned from Senior Buddy project to conduct surveys and find solutions to identified problems. **Standard: *Mathematical Reasoning*** **3.0** *Students move beyond a particular problem by generalizing to other situations.* **Service Learning Activity:** Make generalizations based on findings and apply generalizations to other situations.	English/Language Arts, Science History/Social Science, Health Education, Visual and Performing Arts

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
5	**<u>Dog Food Drive:</u>** Contact a local animal shelter, clinic, sanctuary, or pet adoption agency to identify a need for proper nutrition of abused or neglected dogs. Many local agencies distribute dog food to homeless and impoverished dog owners. Collection drive and distribution activities provide opportunities for mathematical learning. **Standard:** ***Number Sense*** **1.0** *Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.* **Service Learning Activity:** *Activity One:* Hold up a five-pound bag of dog food to students. Empty it into an open bin or clear container. Ask students to estimate the total number of morsels. Remove 1/2 pound of dog food, count the number of morsels, and allow students to revise their original estimate. Interpret the number of morsels in 1/2 pound of dog food as a percentile of the entire five-pound bag. For example: • 5 (total pounds of bag) ÷ 1/2 (pound increments) = 5 x 2/1 = 10/1 = 10% • 1/2 pound or 200 morsels represents 1/10 or .10 or 10% of entire five-pound bag. *Activity Two*: Ask students to estimate the average number of servings contained in a five-pound bag of dog food based on the recommendations of the manufacturer of a single serving for an average sized dog. Measure out an average portion and ask students to revise their estimate, if desired. Determine the number of servings contained in an entire five-pound bag of dog food. Interpret a single serving as a percentile of the entire five-pound bag in decimal and fractional terms. For example: • 1 (five-pound bag) ÷ 20 (servings) = 1/20 = .05 = 20% • 10 (bags) x 5 (pounds each) = 50 (total number of pounds needed)	English/Language Arts, Science, Visual and Performing Arts

5	**<u>Dog Food Drive, cont.,</u>** **Standard: *Number Sense*** **2.0** *Students perform calculations andsolve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.* **Service Learning Activity:** *Activity One:* Using multiplication, calculate the total number of morsels of the five-pound bag using fractional and decimal equivalents. For example: • 1/10 x 10 = .10 x 10 = 10% x 10 = 10/10 = 1.00 = 100% • 200 (morsels of 1/2 pound) x 10 = 2,000 (total morsels of five-pound bag) *Activity Two:* Identify the number of servings of dog food requested by the local agency. Calculate the number of pounds of dog food needed using simple multiplication and division of fractions and decimals For example: If agency requests 200 servings, • 200 (servings needed) ÷ 20 (servings per five-pound bag) = 10 (five-pound bags needed) • 1/20 (one serving from a five-pound bag) x 200 (servings requested) = 200/20 or 10 five-pound bags needed • .05 (one serving from a five-pound bag) x 200 (servings requested) = 10.00 five-pound bags needed **Standard: *Algebra and Functions*** **1.0** *Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.* **Service Learning Activity:** Conduct a dog food collection drive. Establish a reasonable goal (i.e. collect 10 pounds each day for ten days). Record the amount of dog food collected each day on a graph in 1/2 pound increments. Using a simple algebraic equation and information from the graph, determine the amount of dog food collected each day that is below or above the daily goal set (i.e. 10 – x = y; 10 = daily goal in pounds; x = amount of dog food collected; amount of food needed to meet daily goal).	English/Language Arts, Science, Visual and Performing Arts

5	**<u>Dog Food Drive, cont.,</u>** **Standard:** ***Measurement and Geometry*** **1.0** *Students understand and compute the volumes and areas of simple objects.* **Service Learning Activity:** Construct a cube from 12″ two-dimensional squares. Use the squares to compute the surface area of the cube. Compute the volume of the cube in cubic inches and convert to cubic feet (1,728 square inches = 1 cubic foot). Fill the cube with dog food and weigh it. Use the cube as a measuring device for packaging and distribution. Transfer each cubic foot of dog food to individual plastic bags. Label each bag by volume and weight. **Standard:** ***Statistics, Data Analysis, and Probability*** **1.0** *Students display, analyze, compare, and interpret different data sets, including data sets of different sizes.* **Service Learning Activity:** Using data from total amounts of dog food collected each day, compute the mean, median, and mode for the entire ten day collection drive. Organize daily totals in the form of a histogram and circle graph and explain which type of graph is more appropriate for determining which days netted the most and least amounts of dog food collected.	English/Language Arts, Science, Visual and Performing Arts

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
6	**<u>Candy Bar Fundraiser:</u>** Identify a local agency in need of financial resources (i.e. homeless shelter, environmental group). Students will sell two types of Candy, A and B at different prices. At the end of the candy sale, record amount of candy sold and money collected. **Standard: *Number Sense*** **1.0** *Students compare and order positive and negative fractions, decimals, and mixed numbers. Students solve problems involving fraxtions, ratios, proportions, and percentages:* **Service Learning Activity:** Calculate profit made from sales of Candy A and B as percentages of quantities sold. Use data to determine the ratio between Candy A and B sold in different contexts: • quantity of Candy A sold *to* quantity of Candy B sold • total income from sales of Candy A *to* total income from sales of Candy B • profit made from sales of Candy A *to* profit made from sales of Candy B **Standard: *Number Sense*** **2.0** *Students calculate and solve problems involving addition, subtraction, multiplication, and division.* **Service Learning Activity:** Determine which Candy, A or B is most cost effective in earning higher profits. **Standard: *Algebra and Functions*** **1.0** *Students write verbal expresions and sentences as algebraic expressions and equations; they evaluate algebraic expressions, solve simple linear equations, and graph and interpret their results.* **Service Learning Activity:** Create an algebraic equation using variables of amounts sold to determine proportion of profit earned by sale of each type of candy. (i.e. If profit from Candy A is $0.25 each, profit from Candy B is $0.50 each, and total profit from all sales is $50.00, the following equation may be used to determine proportion of sales of each type of candy : (0.25)(Number of Candy A sold) + (0.50)(Number of Candy B sold) = 50.00 Solve for (Number of Candy A sold)	English/Language Arts, Science History/Social Science, Visual and Performing Arts

6	**<u>Candy Bar Fundraiser, cont.,</u>** **Standard: *Mathematical Reasoning*** **2.0** *Students use strategies, skills, and concepts in finding solutions.* **Service Learning Activity:** Graph results to findings above to find a solution to problem. **Standard: *Mathematical Reasoning*** **3.0** *Students move beyond a particular problem by generalizing to other situations..* **Service Learning Activity:** Use skills and generalizations to organize a fundraiser in the future that may yield higher profits.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
7	**<u>Community Face Lift:</u>** Identify a simple structure (house, fence, community center) in need of a fresh coat of paint. Planning and implementing project provides a variety of mathematical learning opportunities. **Standard: *Number Sense*** **1.0** *Students know the properties of, and compute with, rational numbers expressed in a variety of forms.* **Service Learning Activity:** Students calculate amount and cost of materials and supplies needed. Organize fundraising campaign if needed. Calculate the amount of time needed to complete the task. **Standard: *Algebra and Functions*** **1.0** *Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs..* **Service Learning Activity:** Students use algebraic equations to compare cost of using paint from at least three different price categories. **Standard: *Algebra and Functions*** **3.0** *Students graph and interpret linear and some nonlinear functions.* **Service Learning Activity:** Graph and interpret linear functions above to determine best use of funds available. **Standard: *Measurement and Geometry*** **2.0** *Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale..* **Service Learning Activity:** Students measure and compute the surface area of each face of the structure to be painted to determine the amount of paint needed.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

7	**<u>Community Face Lift, cont.,</u>** **Standard: *Measurement and Geometry*** **3.0** *Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures.* **Service Learning Activity:** Before actual painting begins, students must seek approval for proposed project. Students construct a model, to scale, of the structure to be painted and make a presentation to the appropriate agency for approval. **Standard: *Mathematical Reasoning*** **1.0** *Students make decisions about how to approach problems.* **Service Learning Activity:** Students make decisions about how they will determine the amount and type of paint needed, cost of materials and supplies. **Standard: *Mathematical Reasoning*** **1.0** *Students use strategies, skills, and concepts in finding solutions.* **Service Learning Activity:** Students use strategies, skills, and concepts to determine the amount and type of paint needed, cost of materials and supplies.	English/Language Arts, Science History/Social Science, Visual and Performing Arts

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
8-12	**Be a Tax Consultant!** Many taxpayers are unaware of the effect of medical expenses on income tax. Students can assist the public understand the impact of medical expenses when computing their income tax forms. **Standard:** ***Algebra I*** *Symbolic reasoning and calculations with symbols are central in algebra. Through the study of algebra, a student develops an understanding of the symbolic language of mathematics and the sciences. In addition, algebraic skills and concepts are developed and used in a wide variety of problem-solving situations.* **Service Learning Activity:** Enable students to develop symbolic reasoning and algebraic skills by providing them with a number of examples using linear equations that demonstrate how medical expenses affect the income tax of individuals with different incomes. Students can educate the public about the income tax process by demonstrating their mathematical learnings in algebraic terms at public forums, in government offices, or civic group meetings. This public service may help many community members understand the tax advantages legally available to them and save taxpayers hundreds of dollars.	English/Language Arts, Science, Health Education

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
8-12	**<u>Community Playground:</u>** With the guidance of city officials, identify a vacant lot in the community and develop a plan to use the space for a children's playground. **Standard:** ***Geometry*** *The geometry skills and concepts developed in this discipline are useful to all students. Aside from learning these skills and concepts, students will develop their ability to construct formal, logical arguments and proofs in geometric settings and problems.* **Service Learning Activity:** Develop geometry skills and concepts to: • compute the area of the different geometric regions within the lot • compute the volume of soil amendments required for landscaping purposes • draw a scaled plan of the lot • design play equipment in a variety of geometric sizes and shapes • calculate the amount of paint/stain/sealant that may be required to cover the faces of the various geometric shapes.	English/Language Arts, Science Visual and Performing Arts
8-12	**No Parking!** Many public facilities lack adequate parking. Identify an irregular tract of land in an area that could benefit from additional parking spaces. **Standard:** ***Trigonometry*** *Trigonometry uses the techniques that students have previously learned from the study of algebra and Geometry. The trigonometric functions studied are defined geometrically rather than in terms of algebraic Equations. Facility with these functions as well as the ability to prove basic identities regarding them is Especially important for students intending to study calculus, more advanced mathematics, physics and Other sciences, and engineering in college.* **Service Learning Activity:** Compute the area of the land and design a parking lot that allows for the maximum use of parking spaces for compact cars, standard sized cars, handicapped spaces, and appropriate turning space and traffic maneuverability. Consult local traffic agencies for legal space requirements.	English/Language Arts, Science

GRADE LEVEL	STANDARDS/SERVICE LEARNING ACTIVITIES	LINKS TO OTHER CONTENT AREA(S)
8-12	**Data Driven Instruction:** Involve students in the interpretation of data from standardized assessment measures. **Standard:** ***Probability and Statistics*** *This discipline is an introduction to the study of probability, interpretation of data, and fundamental statistical problem solving. Mastery of this academic content will provide students with a solid foundation in probability and facility in processing statistical information.* **Service Learning Activity:** Protect the privacy of individual student test scores but enable students to desegregate data and provide teachers with valuable information that can assist them in redesigning their instructional practices to increase test scores and academic achievement.	English/Language Arts, Science History/Social Science